

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) For use in a transceiver, an adaptive data insertion mechanism for inserting data within a transport stream without destructive disturbance comprising:

a bandwidth estimator producing an estimate of future available bandwidth within said transport stream from future programming information to be transmitted by said transport stream;

a scheduler prioritizing and scheduling insertion of insertion content to be inserted within said transport stream based upon said estimate of future available bandwidth and ~~characteristics~~ required insertion bandwidth of said insertion content; and

an insertion unit inserting scheduled insertion content within said transport stream by replacement of selected replaceable content within said transport stream to form a new transport stream

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

if sufficient bandwidth is available, said sufficient bandwidth
being determined from said estimate of future available bandwidth
and said required insertion bandwidth.

2. (Currently Amended) The adaptive data insertion mechanism as set forth in Claim 1 wherein said bandwidth estimator further produces said estimate of future available bandwidth from periodic bandwidth utilization measurements for said transport stream and information regarding current programming ~~to be transmitted~~ by said transport stream.

3. (Original) The adaptive data insertion mechanism as set forth in Claim 1 wherein said insertion unit replaces selected packets within said transport stream which include one of one or more selected packet type identifiers with packets for said insertion content while passing packets which include packet type identifiers other than said selected packet type identifiers to form said new transport stream.

4. (Original) The adaptive data insertion mechanism as set

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

forth in Claim 3 wherein said insertion unit replaces null packets within an MPEG-2 transport stream.

5. (Currently Amended) A transceiver comprising:

an input connection receiving an incoming transport stream;

an output connection from which a new transport stream is transmitted, said new transport stream including at least portions of said incoming transport stream; and

an adaptive data insertion mechanism for inserting data within said incoming transport stream without destructive disturbance comprising:

a bandwidth estimator producing an estimate of future available bandwidth within said incoming transport stream from future programming to be transmitted by said transport stream;

a scheduler prioritizing and scheduling insertion of insertion content to be inserted within said new transport stream based upon said estimate of future available bandwidth and ~~characteristics~~ required insertion bandwidth of said insertion content obtained from a source separate from said incoming transport stream; and

an insertion unit inserting scheduled insertion content within

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

said new transport stream by replacement of selected replaceable content within said incoming transport stream to form said new transport stream if sufficient bandwidth is available, said sufficient bandwidth being determined from said estimate of future available bandwidth and said required insertion bandwidth.

6. (Currently Amended) The transceiver as set forth in Claim 5 wherein said bandwidth estimator further produces said estimate of future available bandwidth from periodic bandwidth utilization measurements for said incoming transport stream and information regarding current programming ~~to be transmitted~~ by said incoming transport stream.

7. (Original) The transceiver as set forth in Claim 5 wherein said insertion unit replaces selected packets within said incoming transport stream which include one of one or more selected packet type identifiers with packets for said insertion content while passing packets which include packet type identifiers other than said selected packet type identifiers to form said new transport stream.

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

8. (Original) The transceiver as set forth in Claim 6 wherein said insertion unit replaces null packets within an MPEG-2 transport stream.

9. (Currently Amended) For use in a transceiver, a method of adaptive data insertion within a transport stream without destructive disturbance comprising the acts of:

producing an estimate of future available bandwidth within the transport stream from future programming to be transmitted by the transport stream;

prioritizing and scheduling insertion of insertion content to be inserted within the transport stream based upon the estimate of future available bandwidth and characteristics required insertion bandwidth of said insertion content; and

inserting scheduled insertion content within the transport stream by replacement of selected replaceable content within the transport stream to form a new transport stream if sufficient bandwidth is available, said sufficient bandwidth being determined from said estimate of future available bandwidth and said required

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

insertion bandwidth.

10. (Currently Amended) The method as set forth in Claim 9 wherein the step-act of producing an estimate of future available bandwidth within the transport stream further comprises the act of:
producing the estimate of future available bandwidth from periodic bandwidth utilization measurements for the transport stream and information regarding current programming ~~to be~~ transmitted on the transport stream.

11. (Currently Amended) The method as set forth in Claim 9 wherein the step-act of inserting scheduled insertion content within the transport stream by replacement of selected replaceable content within the transport stream to form a new transport stream further comprises the act of:

replacing selected packets within the transport stream which include one of one or more selected packet type identifiers with packets for the insertion content while passing packets which include packet type identifiers other than the selected packet type identifiers to form the new transport stream.

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

12. (Currently Amended) The method as set forth in Claim 11 wherein the step-act of replacing selected packets within the transport stream which include one of one or more selected packet type identifiers with packets for the insertion content while passing packets which include packet type identifiers other than the selected packet type identifiers to form the new transport stream further comprises the act of:

replacing selected null packets within an MPEG-2 transport stream.

13. (Currently Amended) A computer program product within a computer usable medium for adaptive data insertion within a transport stream without destructive disturbance comprising:

instructions for producing an estimate of future available bandwidth within the transport stream derived from future programming to be transmitted by said transport stream;

instructions for prioritizing and scheduling insertion of insertion content to be inserted within the transport stream based upon the estimate of future available bandwidth and ~~characteristics~~

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

required insertion bandwidth of said insertion content; and
instructions for inserting scheduled insertion content within the transport stream by replacement of selected replaceable content within the transport stream to form a new transport stream if sufficient bandwidth is available, said sufficient bandwidth being determined from said estimate of future available bandwidth and said required insertion bandwidth.

14. (Currently Amended) The computer program product as set forth in Claim 13 wherein the instructions for producing an estimate of future available bandwidth within the transport stream further comprise:

instructions for producing the estimate of future available bandwidth from periodic bandwidth utilization measurements for the transport stream and information regarding current programming to be transmitted on the transport stream.

15. (Original) The computer program product as set forth in Claim 14 wherein the instructions for inserting scheduled insertion content within the transport stream by replacement of selected

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

replaceable content within the transport stream to form a new transport stream further comprise:

instructions for replacing selected packets within the transport stream which include one of one or more selected packet type identifiers with packets for the insertion content while passing packets which include packet type identifiers other than the selected packet type identifiers to form the new transport stream.

16. (Original) The computer program product as set forth in Claim 15 wherein the instructions for replacing selected packets within the transport stream which include one of one or more selected packet type identifiers with packets for the insertion content while passing packets which include packet type identifiers other than the selected packet type identifiers to form the new transport stream further comprise:

instructions for replacing selected null packets within an MPEG-2 transport stream.

17. (Currently Amended) A data transport stream embedded in a

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

carrier comprising:

a first portion derived from a transport stream; and

a second portion derived from insertion content, wherein a ratio of the first portion to the second portion is determined by an estimate of available bandwidth within said transport stream representing selected replaceable content within said transport stream and by insertion of said insertion content by replacement of said selected replaceable content within said transport stream with portion of said insertion content to form said data transport stream if sufficient bandwidth is available, said sufficient bandwidth being determined from said estimate of available bandwidth and required insertion bandwidth of said insertion content,

wherein said estimate of available bandwidth within said transport stream is derived from information regarding future programming to be transmitted on said transport stream.

18. (Currently Amended) The data transport stream as set forth in Claim 17 wherein said estimate of available bandwidth within said transport stream is further derived from periodic bandwidth

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

utilization measurements for said transport stream and information regarding current programming ~~to be transmitted~~ on said transport stream.

19. (Original) The data transport stream as set forth in Claim 17 wherein:

said first portion further comprises packets within said transport stream which include packet type identifiers other than one or more selected packet type identifiers; and

said second portion further comprises packets for said insertion content in place of packets within said transport stream which include one of said one or more selected packet type identifiers.

20. (Original) The data transport stream as set forth in Claim 19 wherein said second portion further comprises packets for said insertion content in place of null packets within an MPEG-2 transport stream forming the transport stream.

21. (New) The adaptive data insertion mechanism as set forth

PATENT
Serial No. 09/821,122
Amendment in Reply to Office Action of November 22, 2005

in Claim 1 wherein said scheduler is further configured to prioritize and schedule said insertion of said insertion content within said transport stream based upon bit rate requirement of said insertion content, priority of said insertion content, and remaining available bandwidth within said estimate of future available bandwidth.

22.(New) The adaptive data insertion mechanism as set forth in Claim 1 wherein said future programming information is obtained from an electronic program guide, event information tables and history tables tracking bandwidth utilization as a function of a time of day.

23.(New) The adaptive data insertion mechanism as set forth in Claim 1 wherein said future programming information is obtained from at least one of an electronic program guide, event information tables and history tables tracking bandwidth utilization as a function of a time of day.

24.(New) The adaptive data insertion mechanism as set forth

PATENT

Serial No. 09/821,122

Amendment in Reply to Office Action of November 22, 2005

in Claim 1, further comprising an override unit configured to insert said insertion content even when said sufficient bandwidth is not available for a desired quality by reducing said desired quality.

25. (New) The adaptive data insertion mechanism as set forth in Claim 1, further comprising an override unit configured to insert further insertion content instead of said scheduled insertion content when said further insertion content has a higher priority than said scheduled insertion content.